

➤ 9304C Series, 9310C Series, 9314C Series

Signal Capture

Acquisition System

Bandwidth (–3 dB):

- **9304C Series**
 - @ 50 Ω : DC to 200 MHz
 - @ 1 M Ω : DC to 160 MHz typical at probe tip
- **9310C/9314C Series):**
 - @ 50 Ω : DC to 400 MHz
 - @ 1 M Ω : DC to 230 MHz typical at probe tip

Number of Channels:

- **9304C/9314C Series:** four
- **9310C Series:** two

Number of Digitizers:

- **9304C/9314C Series:** four
- **9310C Series:** two

Max. Sample Rate: 100 MS/s simultaneously on each channel

Sensitivity: 2 mV/div to 5 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors

Offset Range:

- 2.00–9.9 mV/div: ± 120 mV
- 10.0–199 mV/div: ± 1.2 V
- 0.2–5.0 V/div: ± 24 V

DC Accuracy: ± 2 % full scale (eight divisions) at 0 V offset

Vertical Resolution: 8 bits

Bandwidth Limiter: 30 MHz

Note: Where a particular model or a series is NOT mentioned, the specification concerned applies to all related models.



| Model | 9304C | 9304CM | 9310C | 9310CM | 9310CL | 9314C | 9314CM | 9314CL |
|--------------------------------|-------|--------|-------|--------|--------|-------|--------|--------|
| Number of Channels | Four | | Two | | | Four | | |
| Acquisition Memory per Channel | 50 k | 200 k | 50 k | 200 k | 1 M | 50 k | 200 k | 1 M |

Input Coupling: AC, DC, GND



Specifications



Input Impedance: 1 M Ω //15 pF (system capacitance using PP002) or 50 Ω \pm 1 %

Max. Input:

- 50 Ω : \pm 5 V DC (500 mW) or 5 V rms
- 1 M Ω : 250 V max (DC + peak AC \leq 10 kHz)

Acquisition Modes

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 10 μ s/div

Single shot: For transient and repetitive signals from 50 ns/div

Sequence: Stores multiple events in segmented acquisition memories

Deadtime Between Segments: \leq 80 μ s

Number of Segments Available:

| Model | | | Segments |
|--------|--------|--------|----------|
| 9304C | 9310C | 9314C | 2–200 |
| 9304CM | 9310CM | 9314CM | 2–500 |
| 9310CL | 9314CL | | 2–2000 |

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: \pm 0.002%

Interpolator resolution: 10 ps

Roll Mode: Ranges 500 ms–1000 s/div

For > 50 000 points: 10–1000 s/div

External Clock: \leq 100 MHz on EXT input with ECL, TTL or zero crossing levels

Triggering System

Modes: Normal, Auto, Single, and Stop

Sources: CH1, CH2 (plus CH3 and CH4 on four-channel models), Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently

Slope: Positive, Negative, Window (Bislope)

Coupling: AC, DC, HF (up to 500 MHz), LFREJ, HFREJ

Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments



Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments

Holdoff by Time: 10 ns–20 s

Holdoff by Events: 0–99 999 999 events

Internal Trigger Range: ± 5 div

EXT Trigger Max Input:

- 50 Ω $\pm 1\%$: ± 5 V DC (500 mW) or 5 V rms
- 1 M Ω /15 pF: 250 V max. (DC + peak AC ≤ 10 kHz)

EXT Trigger Range: ± 0.5 V (± 5 V with Ext/10)

Trigger Timing: Trigger Date and Time listed in “Memory Status” menu

SMART Trigger Types

Signal Width: Triggers on width between two limits of between 2.5 ns and 20 s

Signal Interval: Triggers on interval between two limits of between 10 ns and 20 s

Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s

State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source

TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video

Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations

Autosetup

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV to 40 V; frequency above 50 Hz; Duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset



Probes

Probe Model: One PP002 probe supplied per channel; FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 M Ω , 500 mV into 50 Ω , frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)



Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal)

raster

Resolution: 810 x 696 points

Grids: 1, 2, or 4 grids.

Formats: YT, XY and both together

Graticules: Internally generated; separate intensity control for grids and waveforms

Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots

Modes: Normal, XY, Variable or Infinite Persistence

Real-time Clock: Date, hours, minutes, seconds

Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 40 μ V sensitivity)

Horizontal Zoom:

| Model | | | Zoom Factor |
|--------|--------|--------|-------------|
| 9304C | 9310C | 9314C | 1000x |
| 9304CM | 9310CM | 9314CM | 5000x |
| 9310CL | 9314CL | | 20 000x |



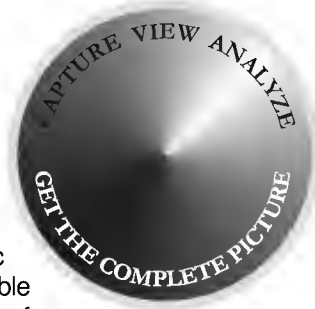
Signal Analysis

Waveform Processing

Processing Functions: Add, Subtract, Multiply, Divide, Negate, Identity and Summation Averaging; four functions performable at one time

Average: Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package

Extrema: Roof, Floor or Envelope values of from 1 to 10^6 waveforms with optional WP01 Advanced Waveform Math Package



ERES: Low-Pass digital filter provides up to 11 bits vertical resolution; sampled data always available, even when trace turned off; any of above modes usable without destroying data — with WP01 Option

FFT: Spectral Analysis with five windowing functions and FFT averaging, with optional WP02 Spectrum Analysis Package

Histogramming and Trending: With optional WP03 Parameter Analysis Package, in-depth diagnostics on waveform parameters

Internal Memory

Waveform Memory: Up to four 16-bit Memories (M1, M2, M3, M4)

Processing Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D)

Setup Memory: Four non-volatile memories; optional cards for high-capacity waveform and setup storage

Cursor Measurements

Relative Time: Arrow cursors measure time and voltage differences relative to each other

Relative Voltage: Horizontal bars measure voltage differences up to $\pm 0.2\%$ full-scale in single-grid mode

Absolute Time: Cross-hair marker measures time relative to trigger and voltage with respect to ground

Absolute Voltage: Reference bar measures voltage with respect to ground

Interfacing

Remote Control: By GPIB and RS-232-C for all front-panel controls, internal functions

RS-232-C Port: Asynchronous up to 115.2 Kb/s for computer or terminal control, or printer or plotter connection

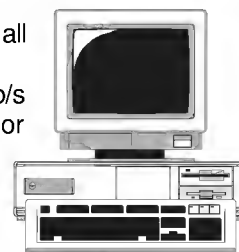
GPIB Port: (IEEE-488.1) Configurable as talker/listener for computer control and fast data transfer; command language compliant with IEEE-488.2

Centronics Port: Hardcopy interface

PC Card (PCMCIA II/III Ports): Optional for memory cards, flash cards and removable hard disks

Floppy Disk: High density 3.5-inch floppy disk drive (DOS format)

Hardcopy: TIFF and BMP formats available for import to Desktop Publishing programs; printers and plotters — HP DeskJet, HP ThinkJet, QuietJet, LaserJet, PaintJet, and EPSON printers; HP 7400 and 7500 series, or HPGL compatible plotters





Specifications

- Optional internal, high-resolution graphics printer
- Output Formats:** Binary, or ASCII waveform output compatible with spreadsheets, MATLAB™, MathCad™

General

Auto-calibration: Ensures specified DC and timing accuracy
Temperature: 5 to 40 °C (41 to 104 °F) rated
Humidity: 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C
Altitude: Up to 2000 m (6560 ft) operating, 40 °C max
Power: 90–250 V AC, 45–66 Hz, 150 W
Battery Backup: Front-panel settings maintained for two years
Dimensions: (HWD) 8.5 x 14.5 x 16.25 inches / 264 x 397 x 453 mm
Weight: 12.5 kg (27.5 lb.) net, 18 kg (40 lb.) shipping
Warranty: Three years

Conformity

EMC: EN 50082-1 conformity
Safety: Designed to comply with EN 61010-1; UL and cUL listed, File E 170588: Protection Category I, Installation (Over-Voltage) Category II, Pollution Degree 2
See Declaration of Conformity for further details.

➤ **9344C Series, 9350C Series, 9354C Series**

Signal Capture

Acquisition System



Bandwidth (-3 dB):

- **9344C Series**
 - @ 50 Ω : DC to 500 MHz
 - 100 mV/div: 400 MHz
 - 50 mV/div and below: 350 MHz
 - @ 1 M Ω : DC to 500 MHz typical at tip of optional FET probe AP020
- **9350C/9354C Series:**
 - @ 50 Ω : DC to 500 MHz
 - 100 mV/div: 400 MHz
 - 50 mV/div and below: 350 MHz
 - @ 1 M Ω : DC to 500 MHz typical at tip of optional FET probe AP020

Number of Channels:

- **9344C/9354C Series:** four
- **9350C Series:** two

Number of Digitizers:

- **9344C/9354C Series:** four
- 9350C Series:** two

| 9344C Series | | | | | |
|---|-----------------|---|-----------|---------|-----------------|
| CHANNELS USED (PEAK DETECT ON/OFF) | MAX SAMPLE RATE | MEMORY PER CHANNEL (IN POINTS) PER MODEL | | | ACTIVE CHANNELS |
| | | C | CM | CL | |
| All (Peak Detect Off) | 250 MS/s | 50k | 250k | 2M | All |
| All (Peak Detect ON) | 100 MS/s data | 25k data | 100k data | 1M data | All |
| | 200 MS/s peak | 25k peak | 100k peak | 1M peak | |
| Two Channels Paired (Peak Detect OFF) | 500 MS/s | 100k | 500k | 4M | CH 2 and CH 3 |
| Four Channels Combined (Peak Detect OFF) | 1000 MS/s | 250k | 500k | 4M | CH 2 |



Specifications

| 9350C/9354C Series | | | | | | |
|---|-----------------|---|-----------|---------|--------------------|-------------|
| CHANNELS USED (PEAK DETECT ON/OFF) | MAX SAMPLE RATE | MEMORY PER CHANNEL (IN POINTS) PER MODEL | | | ACTIVE CHANNELS | |
| | | C | CM | CL | | |
| All (Peak Detect OFF) | 500 MS/s | 50k | 250k | 2M | All | |
| All (Peak Detect ON) | 100 MS/s data | 25k data | 100k data | 1M data | All | |
| | 400 MS/s peak | 25k peak | 100k peak | 1M peak | 2.5 ns peak detect | |
| Two Channels Paired (Peak Detect OFF) | 1 GS/s | 100k | 500k | 4M | 9350C/M/L | 9354C/M/L |
| | | | | | CH 1 | CH 2 + CH 3 |
| FOUR-CHANNEL MODELS ONLY | | | | | | |
| Four Channels Combined by PP092 Adapter (Peak Detect OFF) | 2 GS/s | 250k | 1M | 8M | CH 2 (PP092 input) | |
| 9354CTM | | | | | | |
| All (Peak Detect OFF) | 500 MS/s | 500 000 | | | All | |
| Two Channels Paired (Peak Detect OFF) | 1 GS/s | 1M | | | CH 2 and CH 3 | |
| All Peak Detect ON | 100 MS/s data | 250k data | | | All | |
| | 400 MS/s peak | 250k peak | | | 2.5 ns peak detect | |
| Four Channels Combined by PP092 Adapter (Peak Detect OFF) | 2 GS/s | 2M | | | CH 2 (PP092 input) | |

Sensitivity: 2 mV/div to 5 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors

Offset Range:

- 2.00–9.9 mV/div: ±120 mV
- 10.0–199 mV/div: ±1.2 V
- 0.2–5.0 V/div: ±24 V

DC Accuracy: typically 1%

Vertical Resolution: 8 bits

Bandwidth Limiter: 30 MHz

Input Coupling: AC, DC, GND



Input Impedance: 50 Ω \pm 1 % or 1 M Ω //15 pF (system capacitance using PP002)

Max. Input:

- 50 Ω : \pm 5 V DC (500 mW) or 5 V rms
- 1 M Ω : 250 V max (DC + peak AC \leq 10 kHz)

Acquisition Modes

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 2 μ s/div

- **9344C Series, 9350CM/CL, 9354CM/CL/CTM:** For repetitive signals from 1 ns/div to 5 μ s/div

Single shot:

- **9344C Series:** For transient and repetitive signals from 20 ns/div (all channels active)
- **9350C, 9354C Series:** For transient and repetitive signals from 10 ns/div (all channels active)

Peak Detect:

- **9344C Series:** Captures and displays 5 ns glitches and other high-speed events
- **9350C, 9354C Series:** Captures and displays 2.5 ns glitches and other high-speed events

Sequence: Stores multiple events in segmented acquisition memories

Deadtime Between Segments: \leq 80 μ s

Number of Segments Available:

| Model | | | | Segments |
|--------|--------|--------|---------|----------|
| 9344C | 9350C | 9354C | | 2–200 |
| 9344CM | 9350CM | 9354CM | 9354CTM | 2–500 |
| 9344CL | 9350CL | 9354CL | | 2–2000 |

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: \leq 10 ppm

Interpolator resolution: 10 ps

Roll Mode:

- **9344C:** Ranges 500 ms–1000 s/div
- **9350C, 9354C Series:** Ranges 500 ms–1000 s/div; >50 000 points: 10–1000 s/div

External Clock: \leq 100 MHz on EXT input with ECL, TTL or zero crossing levels



Triggering System



Modes: Normal, Auto, Single, and Stop
Sources: CH1, CH2 (plus CH3 and CH4 on four-channel models), Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently
Slope: Positive, Negative
Coupling: AC, DC, HF (up to 500 MHz), LFREJ, HFREJ
Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments
Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments
Holdoff by Time: 10 ns–20 s
Holdoff by Events: 0–99 999 999 events
Internal Trigger Range: ± 5 div
EXT Trigger Max Input:
➤ 50 Ω ± 1 %: ± 5 V DC (500 mW) or 5 V rms
➤ 1 M Ω /15 pF: 250 V max. (DC + peak AC ≤ 10 kHz)
EXT Trigger Range: ± 0.5 V (± 5 V with Ext/10)
Trigger Timing: Trigger Date and Time listed in “Memory Status” menu

SMART Trigger Types

Signal or Pattern Width: Triggers on width between two limits of between 2.5 ns and 20 s
Signal or Pattern Interval: Triggers on interval between two limits of between 10 ns and 20 s
Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s
State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source
TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video
Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations
Pattern Trigger:
➤ **Two-channel models:** Triggers on the logic combination of the three inputs CH 1, CH 2 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end
➤ **Four-channel models:** Triggers on the logic combination of the five inputs CH 1, CH 2, CH 3, CH 4 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end

Autosetup



Probes

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV to 40 V; frequency above 50 Hz; duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset

Probe Model: One PP002 probe supplied per channel, DC to 250 MHz typical at probe tip, 600 V max.; FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 M Ω , 500 mV into 50 Ω , frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)

Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal)

raster

Resolution: 810 x 696 points

Grids: 1, 2, or 4 grids.

Formats: YT, XY and both together

Graticules: Internally generated;
separate intensity control for grids and waveforms

Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots

Modes: Normal, XY, Variable or Infinite Persistence

Real-time Clock: Date, hours, minutes, seconds

Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 40 μ V sensitivity, with optional WP01 Advanced Waveform Math Package)

Horizontal Zoom: Waveforms can be expanded to give 2–2.5 points/div



| Model | | | Zoom Factor |
|---------|--------|--------|-------------|
| 9344C | 9350C | 9354C | 2000x |
| 9344CM | 9350CM | 9354CM | 10 000x |
| 9354CTM | | | 50 000x |
| 9344CL | 9350CL | 9354CL | 100 000x |



Signal Analysis

Waveform Processing

Processing functions: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging, and Sine x/x; four functions performable at one time
Average: Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package

Extrema: Roof, Floor or Envelope values of from 1 to 10^6 waveforms with optional WP01 Advanced Waveform Math Package

ERES: Low-Pass digital filter provides up to 11 bits vertical resolution; sampled data always available, even when trace turned off; any of above modes usable without destroying data — with WP01 Option

FFT: Spectral Analysis with five windowing functions and FFT averaging, with optional WP02 Spectrum Analysis Package

Histogramming and Trending: With optional WP03 Parameter Analysis Package, in-depth diagnostics on waveform parameters



Internal Memory

Waveform Memory: Up to four 16-bit Memories (M1, M2, M3, M4)

Processing Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D)

Setup Memory: Four non-volatile memories; optional cards or disks for high-capacity waveform and setup storage

Cursor Measurements

Relative Time: Arrow cursors measure time and voltage differences relative to each other

Relative Voltage: Horizontal bars measure voltage differences up to $\pm 0.2\%$ full-scale in single-grid mode

Absolute Time: Cross-hair marker measures time relative to trigger and voltage with respect to ground

Absolute Voltage: Reference bar measures voltage with respect to ground

9344C Series, 9350C Series, 9354C Series

Interfacing



Remote Control: By GPIB and RS-232-C for all front-panel controls, internal functions

RS-232-C Port: Asynchronous up to 115.2 Kb/s for computer or terminal control, or printer or plotter connection

GPIB Port: (IEEE-488.1) Configurable as talker/listener for computer control and fast data transfer; command language compliant with IEEE-488.2

Centronics Port: Hardcopy interface

PC Card (PCMCIA II/III Ports): Optional for memory cards, flash cards and removable hard disks

Floppy Disk: High density 3.5-inch floppy disk drive (DOS format)

Hardcopy: TIFF and BMP formats

available for import to Desktop

Publishing programs; printers and

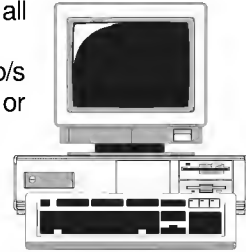
plotters: HP DeskJet, HP ThinkJet,

QuietJet, LaserJet, PaintJet, and

HP 7400 and 7500 series, or HPGL compatible plotters

➤ Optional internal, high-resolution graphics printer

Output Formats: Binary, or ASCII waveform output compatible with spreadsheets, MATLAB, Mathcad



General

Auto-calibration: Ensures specified DC and timing accuracy

Temperature: 5 to 40 °C (41 to 104 °F) rated

Humidity: 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C

Altitude: Up to 2000 m (6560 ft) operating, 40 °C max

Power: 90–250 V AC, 45–66 Hz, 230 W

Battery Backup: Front-panel settings maintained for two years

Dimensions: (HWD) 8.5 x 14.5 x 16.25 inches / 264 x 397 x 453 mm

Weight: 13 kg (28.6 lb.) net, 18.5 kg (40.7 lb.) shipping

Warranty: Three years

Conformity

EMC: EN 50082-1 conformity

Safety: Designed to comply with EN 61010-1; UL and cUL listed, File E 170588: Protection Category I, Installation (Over-Voltage) Category II, Pollution Degree 2

See Declaration of Conformity for further details.



➤ 9370C Series, 9374C Series

Signal Capture

Acquisition System

Bandwidth (-3 dB):

- @ 50 Ω : DC to 1 GHz
10 mV/div and above
- @ 1 M Ω : DC to 500 MHz typical
at PP005 probe tip
 - 1 GHz FET probe optional

Number of Channels, Digitizers:

- **9374C Series:** four
- **9370C Series:** two

Sensitivity:

- 50 Ω : 2 mV/div to 1 V/div, fully variable
- 1 M Ω : 2 mV/div to 10 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors



| 9370C/9374C Series | | | | | | | |
|---|--------------------|-----------------------------|-----------|-----------|---------|--------------------|--------------|
| CHANNELS USED (PEAK DETECT ON/OFF) | MAX SAMPLE RATE | MEMORY PER CHANNEL (POINTS) | | | | ACTIVE CHANNELS | |
| | | Model | | | | | |
| | | C | CM | CTM | CL | | |
| All (Peak Detect OFF) | 500 MS/s | 50k | 250k | 500k | 2M | All | |
| All (Peak Detect ON) | 100 MS/s data | 25k data | 100k data | 250k data | 1M data | All | |
| | 400 MS/s peak | 25k peak | 100k peak | 250k peak | 1M peak | 2.5 ns peak detect | |
| Two Channels Paired (Peak Detect OFF) | 1 GS/s | 100k | 500k | 1M | 4M | 9370C/M/L | 9374C/M/L/TM |
| | | | | | | CH 1 | CH 2 + CH 3 |
| FOUR-CHANNEL MODELS ONLY | | | | | | | |
| Four Channels Combined by PP093 Adapter (Peak Detect OFF) | 2 GS/s | 250k | 1M | 2M | 8M | One (PP093 input) | |



Acquisition Modes

Offset Range:

- 2.00–4.99 mV/div: ± 400 mV
- 5–99 mV/div: ± 1 V
- 0.1–1 V/div: ± 10 V
- 1–10 V/div: ± 100 V (1 M Ω Only)

DC Accuracy: typically 1%

Vertical Resolution: 8 bits

Bandwidth Limiter:

- 25 MHz
- 200 MHz

Input Coupling: AC, DC, GND

Input Impedance: 50 Ω ± 1 %, or 1 M Ω /15 pF typical, system capacitance at tip of PP005 probe

Max. Input:

- 50 Ω : ± 5 V DC (500 mW) or 5 V rms
- 1 M Ω : 400 V max (DC + peak AC ≤ 10 kHz)

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 5 μ s/div

Single shot: For transient and repetitive signals from 10 ns/div (all channels active)

Peak Detect: Captures and displays 2.5 ns glitches and other high-speed events

Sequence: Stores multiple events in segmented acquisition memories

Deadtime Between Segments: ≤ 80 μ s

Number of Segments Available:

| Model | | Segments |
|--------|----------------|----------|
| 9370C | 9374C | 2–200 |
| 9370CM | 9374CM | 2–500 |
| 9370CL | 9374CL 9374CTM | 2–2000 |

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: ≤ 10 ppm

Interpolator resolution: 10 ps



Triggering System



SMART Trigger Types

Roll Mode:

- Ranges 500 ms–1000 s/div
- For >50 000 points: 10–1000 s/div

External Clock:

- ≤100 MHz on EXT input with ECL, TTL or zero crossing levels
- Optional 50–500 MHz rear panel fixed frequency clock input

Modes: Normal, Auto, Single, and Stop

Sources: CH1, CH2 (plus CH3 and CH4 on four-channel models), Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently

Slope: Positive, Negative

Coupling: AC, DC, HF, LFREJ, HFREJ

Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments

Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments

Holdoff by Time: 10 ns–20 s

Holdoff by Events: 0–99 999 999 events

Internal Trigger Range: ±5 div

EXT Trigger Max Input:

- 50 Ω ±1 %: ±5 V DC (500 mW) or 5 V rms
- 1 MΩ/15 pF: 400 V max. (DC + peak AC ≤10 kHz)

EXT Trigger Range: ±0.5 V (±5 V with Ext/10)

Trigger Timing: Trigger Date and Time listed in “Memory Status” menu

Signal or Pattern Width: Triggers on width between two limits of between 2.5 ns and 20 s

Signal or Pattern Interval: Triggers on interval between two limits of between 10 ns and 20 s

Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s

State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source

TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video

Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations

Autosetup



Probes

Pattern:

- **Two-channel models:** Triggers on the logic combination of the three inputs CH 1, CH 2 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end
- **Four-channel models:** Triggers on the logic combination of the five inputs CH 1, CH 2, CH 3, CH 4 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV–40 V; frequency above 50 Hz; duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset

Probe Model: One PP005 probe supplied per channel (10:1, 10 M Ω /11 pF, 500 V max input); FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 M Ω , 500 mV into 50 Ω , frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)

Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal)
raster

Resolution: 810 x 696 points

Grids: 1, 2, or 4 grids.

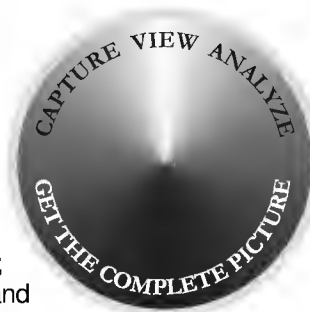
Formats: YT, XY and both together

Graticules: Internally generated;
separate intensity control for grids and waveforms

Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots

Modes: Normal, XY, Variable or Infinite Persistence

Real-time Clock: Date, hours, minutes, seconds





Specifications

Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 40 μ V sensitivity, with optional WP01 Advanced Waveform Math Package)

Horizontal Zoom: Waveforms can be expanded to give 2–2.5 points/div.

| Model | | Zoom Factor |
|---------|--------|-------------|
| 9370C | 9374C | 2000x |
| 9370CM | 9374CM | 10 000x |
| 9374CTM | | 50 000x |
| 9370CL | 9374CL | 100 000x |

Signal Analysis

Waveform Processing

Processing functions: Add, Subtract, Multiply, Divide, Negate, Identity, Summation Averaging, and Sine x/x; four functions performable at one time

Average: Summed averaging of up to 1000 waveforms in the basic instrument; up to 10^6 averages possible with optional WP01 Advanced Waveform Math Package

Extrema: Roof, Floor or Envelope values of from 1 to 10^6 waveforms — with WP01 Option

ERES: Low-Pass digital filter provides up to 11 bits vertical resolution; sampled data always available, even when trace turned off; any of above modes usable without destroying data — with WP01 Option

FFT: Spectral Analysis with five windowing functions and FFT averaging, with optional WP02 Spectrum Analysis Package

Histogramming and Trending: With optional WP03 Parameter Analysis Package, in-depth diagnostics on waveform parameters

Waveform Memory: Up to four 16-bit Memories (M1, M2, M3, M4).

Processing Memory: Up to four 16-bit Waveform Processing Memories (A, B, C, D).

Setup Memory: Four non-volatile memories; optional cards or disks for high-capacity waveform and setup storage



Internal Memory

Cursor Measurements

Relative Time: Arrow cursors measure time and voltage differences relative to each other

Relative Voltage: Horizontal bars measure voltage differences up to $\pm 0.2\%$ full-scale in single-grid mode

Absolute Time: Cross-hair marker measures time relative to trigger and voltage with respect to ground

Absolute Voltage: Reference bar measures voltage with respect to ground

Remote Control: By GPIB and RS-232-C for all front-panel controls, internal functions

RS-232-C Port: Asynchronous up to 115.2 Kb/s for computer or terminal control, or printer or plotter connection

GPIB Port: (IEEE-488.1) Configurable as talker/listener for computer control and fast data transfer; command language compliant with IEEE-488.2

Centronics Port: Hardcopy interface

PC Card (PCMCIA II/III Ports): Optional for memory cards, flash cards and removable hard disks

Floppy Disk: High density 3.5-inch floppy disk drive (DOS format)

Hardcopy: TIFF and BMP formats available for import to Desktop Publishing programs; printers and plotters: HP DeskJet, HP ThinkJet, QuietJet, LaserJet, PaintJet, and EPSON printers; HP 7400 and 7500 series, or HPGL compatible plotters

➤ Optional internal, high-resolution graphics printer

Output Formats: Binary, or ASCII waveform output compatible with spreadsheets, MATLAB, Mathcad

Auto-calibration: Ensures specified DC and timing accuracy

Temperature: 5 to 40 °C (41 to 104 °F) rated

Humidity: 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C

Altitude: Up to 2000 m (6560 ft) operating, 40 °C max

Power: 90–250 V AC, 45–66 Hz, 230 W

Battery Backup: Front-panel settings maintained for two years

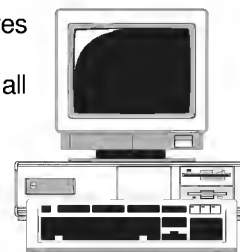
Dimensions: (HWD) 8.5 x 14.5 x 16.25 inches / 264 x 397 x 453 mm

Weight: 13 kg (28.6 lb.) net, 18.5 kg (40.7 lb.) shipping

Warranty: Three years

EMC: EN 50082-1 conformity

Interfacing



General

Conformity



Specifications

Safety: Designed to comply with EN 61010-1; UL and cUL listed,
File E 170588: Protection Category I, Installation (Over-Voltage)
Category II, Pollution Degree 2
See Declaration of Conformity for further details.

➤ 9384C Series

Signal Capture

Acquisition System

Bandwidth (-3 dB):

- @ 50 Ω : DC to 1 GHz
10 mV/div and above
- @ 1 M Ω : DC to 500 MHz typical
at PP005 probe tip
- 1 GHz FET probe optional

Number of Channels: four

Number of Digitizers: four

Sensitivity:

- 50 Ω : 2 mV/div to 1 V/div, fully variable
- 1 M Ω : 2 mV/div to 10 V/div, fully variable

Scale Factors: Wide range of probe attenuation factors

Offset Range:

- 2.00–4.99 mV/div: ± 400 mV
- 5–99 mV/div: ± 1 V
- 0.1–1 V/div: ± 10 V
- 1–10 V/div: ± 100 V (1 M Ω Only)
- ± 20 V over the full sensitivity range using AP 020 FET probe



| 9384C Series | | | | | |
|---|-----------------|--------------------------------|-----------|----------|----------------------|
| CHANNELS USED (PEAK DETECT ON/OFF) | MAX SAMPLE RATE | MEMORY PER CHANNEL (IN POINTS) | | | ACTIVE CHANNELS |
| | | Model | | | |
| | | C | CM/CTM | CL | |
| All (Peak Detect OFF) | 1 GS/s | 100k | 500k | 2M | All |
| All (Peak Detect ON) | 100 MS/s data | 50k data | 250k data | 1M data | All |
| | 400 MS/s peak | 50k peak | 250k peak | 1M peaks | 2.5 ns peak detect |
| Two Channels Paired (Peak Detect OFF) | 2 GS/s | 200k | 1M | 2M | CH2 + CH3 |
| Four Channels Combined by PP094 Adapter (Peak Detect OFF) | 4 GS/s | 400k | 2M | 8M | One (PP094 input) |



Specifications



Acquisition Modes

DC Accuracy: typically 1% at 10 mV and above

Vertical Resolution: 8 bits

Bandwidth Limiter:

- 25 MHz
- 200 MHz

Input Coupling: AC, DC, GND

Input Impedance: 50 Ω \pm 1 %, or 1 M Ω /11 pF typical

Max. Input:

- 50 Ω : \pm 5 V DC
- 1 M Ω : 400 V max (DC + peak AC \leq 10 kHz)

Random Interleaved Sampling (RIS): For repetitive signals from 1 ns/div to 2 μ s/div

Single shot: For transient and repetitive signals from 1 ns/div (all channels active)

Peak Detect: Captures and displays 2.5 ns glitches and other high-speed events

Sequence: Stores multiple events, time-stamped, in segmented acquisition memories

Deadtime Between Segments: \leq 80 μ s

Number of Segments Available:

| Model | | | Segments |
|--------|---------|--------|----------|
| 9384C | | | 2–500 |
| 9384CM | 9384CTM | 9384CL | 2–2000 |

Timebase System

Timebases: Main and up to four Zoom Traces

Time/Div Range: 1 ns/div to 1000 s/div

Clock Accuracy: \leq 10 ppm

Interpolator resolution: 10 ps

Roll Mode:

- Ranges 500 ms–1000 s/div
- For >50 000 points: 10–1000 s/div

Triggering System

Modes: Normal, Auto, Single, and Stop

Sources: CH1, CH2, CH3, CH4, Line, Ext, Ext/10; Slope, Level and Coupling able to be set independently

Slope: Positive, Negative

Coupling: AC, DC, HF, LFREJ, HFREJ

Pre-trigger Recording: 0–100 % of full scale adjustable in 1 % increments

**SMART Trigger Types**

Post-trigger Delay: 0–10 000 divisions adjustable in 0.1 div increments

Holdoff by Time: 10 ns–20 s

Holdoff by Events: 0–99 999 999 events

Internal Trigger Range: ± 5 div

EXT Trigger Max Input:

- 50 Ω $\pm 1\%$: ± 5 V DC (500 mW) or 5 V rms
- 1 M Ω /15 pF: 400 V max. (DC + peak AC ≤ 10 kHz)

EXT Trigger Range: ± 0.5 V (± 5 V with Ext/10)

Trigger Timing: Trigger Date and Time listed in “Memory Status” menu

Signal or Pattern Width: Triggers on width between two limits of between <2.5 ns (1 ns typical) or pulse widths between <2.5 ns and 20 s exclusive

Signal or Pattern Interval: Triggers on interval between two limits of between 10 ns and 20 s

Dropout: Triggers if the input signal drops out for a time-out longer than 25 ns–20 s

State/Edge Qualified: Triggers on any source only if a given state or transition — number of events, time interval — on another source

TV: Selection of both line (up to 1500) and field number (up to 8) for PAL, SECAM, NTSC or nonstandard video

Exclusion Trigger: Triggers only on shorter-than-normal (defined) aberrations

Pattern: Triggers on the logic combination of the five inputs CH 1, CH 2, CH 3, CH 4 and EXT Trigger, where each source can be defined as High, Low or Don't Know and the trigger as the pattern's beginning or end

Autosetup

AUTOSETUP button: Sets timebase, trigger and sensitivity to display wide range of repetitive signals — amplitude 2 mV–40 V; frequency above 50 Hz; duty cycle greater than 0.1%

Autosetup Time: Around two seconds

Vertical Find: Automatically sets sensitivity and offset

**Probes**

Probe Model: One PP005 probe supplied per channel (10:1, 10 M Ω /11 pF, 500 V max input); FET probes, purchased separately, fully compatible with entire scope series

Probe calibration: Max 1 V into 1 M Ω , 500 mV into 50 Ω , frequency and amplitude programmable, pulse or square wave able to be selected, rise and fall time 1 ns typical (calibrator also offers trigger or Pass/Fail output)



Signal Viewing

Display

CRT: 12.5 x 17.5 cm (9" diagonal) raster
Resolution: 810 x 696 points
Grids: 1, 2, or 4 grids.
Formats: YT, XY and both together
Graticules: Internally generated; separate intensity control for grids and waveforms
Waveform Style: Vectors, which can be switched on and off, connect individual sample points highlighted as dots
Modes: Normal, XY, Variable or Infinite Persistence
Real-time Clock: Date, hours, minutes, seconds
Vertical Zoom: Up to 5x Vertical Expansion (50x with averaging, up to 80 μ V sensitivity, with optional WP01 Advanced Waveform Math Package)
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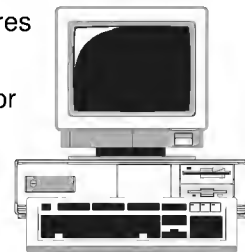
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